Small Business Innovation Research/Small Business Tech Transfer

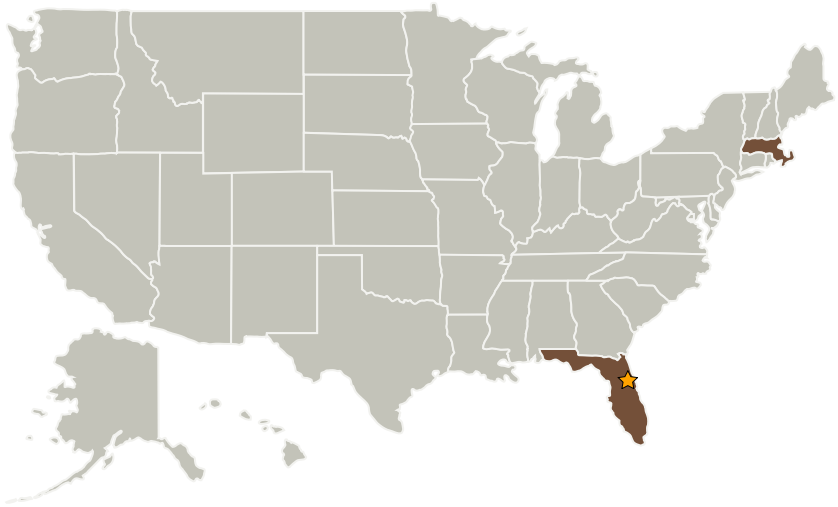
Liquid Crystal Membrane Dust Mitigation System for Lunar or Martian Operations, Phase I

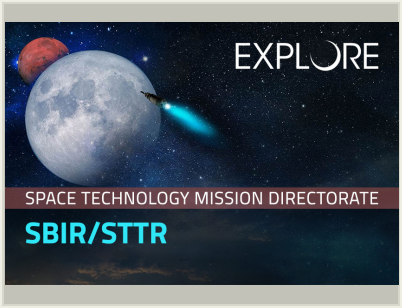
Completed Technology Project (2009 - 2009)

Project Introduction

Lunar dust creates a number of hazards to lunar operations including, effect on human health, degradation of life support systems, wear to mechanical systems and loss of efficiency of solar arrays. Lunar operations require a system which mechanically removes dust from key systems and prevents its redeposition. While there is no wind on the moon, electrical phenomena allow the transport of lunar dust over long distances. Lunar dust is constantly in motion. There are currently no dust mitigation techniques that can be applied to a variety of surfaces which can mechanically remove dust and prevent its redeposition. Electrostatic dust removal techniques are being developed, but these have not been tested with the pure iron particles found in lunar dust and lack mechanical removal schemes needed for imbricated angular particles. Physical Sciences Inc. and West Virginia University proposes a novel liquid crystal membrane dust mitigation system (LCMDMS). This system uses both electro static (conductive layers for charge control) and mechanical (vibrating surface) dust removal/prevention techniques to maintain dust free operation of flexible, curved, transparent and opaque lunar based systems. This system is designed to be transparent and applied as a membrane to a surface which needs to be kept dust free.

Primary U.S. Work Locations and Key Partners





Liquid Crystal Membrane Dust Mitigation System for Lunar or Martian Operations, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Liquid Crystal Membrane Dust Mitigation System for Lunar or Martian Operations, Phase I

Completed Technology Project (2009 - 2009)

Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts

Primary U.S. Work Locations	
Florida	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.5 Particulate Contamination Prevention and Mitigation